

I CLAIM:

1. An apparatus for drying a stack of flats comprising:

A. a housing means defining a base level therewithin and adapted to receive a stack of flats transported thereinto at said base level for facilitating drying thereof;

B. a lifting head means being vertically movably positioned within said housing means to allow movement upwardly into contact with a stack of flats positioned thereabove at said base level to facilitate lifting thereof to a position above said base level, said lifting head means being movable rotatably relative to said housing means about a lifting axis of rotation extending vertically therewithin;

C. a stack lifting means positioned within said housing means at a location below said base level, said stack lifting means being positionable at a retracted level located below said base level within said housing means, said stack lifting means being attached to said lifting head means, said stack lifting means also being vertically movable upwardly within said housing means to said base level to facilitate engagement of said

24 lifting head means with respect to a stack of  
25 trays from beneath for lifting thereof vertically  
26 upwardly to a spin level to facilitate spin drying  
27 thereof, said spin level being located vertically  
28 above said base level within said housing means;

29 D. a drive engagement means mounted within said  
30 housing means at a position above a stack of flats  
31 positioned therein at said base level, said drive  
32 engagement means being mounted within said housing  
33 means to be rotatably movable therewithin about a  
34 drive axis of rotation, said drive engagement  
35 means adapted to engage a stack of flats from  
36 above responsive to movement of the stack of flats  
37 upwardly into abutting contact therewith in order  
38 to urge rotational movement of the stack of flats  
39 responsive to rotational movement of said drive  
40 engagement means; and

41 E. a drive means mounted within said housing means  
42 above the stack of flats positioned at said base  
43 level, said drive means being operatively attached  
44 to said drive plate means for urging rotational  
45 movement thereof responsive to operation of said  
46 drive means to spin dry a stack of flats held at  
47 said spin level between said drive engagement  
48 means in abutment therewith from above and said  
49 lifting head means in abutment with the stack of

50 flats from below and being urged into contact  
51 therewith by said stack lifting means being  
52 positioned at said spin level within said housing  
53 means.

1 2. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said lifting axis of rotation is  
3 positioned above and aligned vertically with respect to  
4 said drive axis of rotation to facilitate spinning of  
5 the stack of flats for drying thereof.

1 3. An apparatus for drying a stack of flats as defined in  
2 Claim 1 further comprising a stack conveying means for  
3 transporting stacks of trays into said drying station  
4 means at said base level therewithin.

1 4. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said drive axis of rotation and said  
3 lifting axis of rotation are oriented axially  
4 coincident with respect to one another.

1 5. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said lifting head means comprises a  
3 support plate means rotatably mounted within said  
4 housing and attached with respect to said stacking  
5 lifting means to be vertically movable therewith.

1 6. An apparatus for drying a stack of flats as defined in  
2 Claim 5 wherein said support plate means includes  
3 support pin means extending vertically therefrom and  
4 adapted to facilitate engagement of said support plate  
5 means with respect to the undersurface of the stack of  
6 flats to facilitate retaining thereof during upward  
7 movement of said stack lifting means and said support  
8 plate means from said base level to said spin level  
9 thereabove.

1 7. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said stack lifting means comprises a  
3 longitudinally extensible means.

1 8. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said stack lifting means comprises an  
3 extensible cylinder means for urging movement of said  
4 lifting head means upwardly into abutment with respect  
5 to a stack of flats at said base level and for lifting  
6 thereof upwardly to said spin level for facilitating  
7 drying thereof.

1 9. An apparatus for drying a stack of flats as defined in  
2 Claim 8 wherein said extensible cylinder means  
3 comprises a pneumatic cylinder member.

1       10. An apparatus for drying a stack of flats as defined in  
2       Claim 1 wherein said drive engagement means comprises a  
3       spinner plate means rotatable about said drive axis of  
4       rotation and adapted to engage a stack of flats moved  
5       upwardly in contact therewith.

1       11. An apparatus for drying a stack of flats as defined in  
2       Claim 10 wherein said spinner plate means includes a  
3       registration means adapted to positively engage a stack  
4       of flats moved upwardly into contact therewith to  
5       provide simultaneous coordinated rotation of said stack  
6       of flats responsive to powered rotation of said drive  
7       engagement means.

1       12. An apparatus for drying a stack of flats as defined in  
2       Claim 11 wherein said registration means comprises a  
3       plurality of alignment pins mounted in said spinner  
4       plate means and extending downwardly therefrom to  
5       facilitate registration of the stack of flats with  
6       respect to said spinner plate means for providing  
7       simultaneous rotational movement of the stack of flats  
8       responsive to powered rotation of said spinner plate  
9       means.

1 13. An apparatus for drying a stack of flats as defined in  
2 Claim 12 wherein said alignment pins are positioned in  
3 a pin array adapted to register with the stack of flats  
4 and cause same to rotate whenever said spinner plate  
5 means is caused to rotate.

1 14. An apparatus for drying a stack of flats as defined in  
2 Claim 13 wherein said pin array forms a rectangular  
3 profile to facilitate engaging of stacks of  
4 rectangularly shaped flats.

1 15. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said housing means includes a slotted  
3 wall means extending therearound to facilitate  
4 retaining of fluids expelled from the stack of trays  
5 during spin drying thereof.

1 16. An apparatus for drying a stack of flats as defined in  
2 Claim 15 wherein said slotted wall means is made of a  
3 translucent material to facilitate observation of the  
4 operation of the apparatus for drying flats.

1 17. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said drive means comprises a spinner  
3 motor for rotationally driving said drive engagement  
4 means selectively.

1 18. An apparatus for drying a stack of flats as defined in  
2 Claim 17 wherein said spinner motor includes a motor  
3 braking means to facilitate alignment of the stack of  
4 flats with respect to said transporting means prior to  
5 placement thereupon after spin drying and further to  
6 facilitate slowing of rotational movement of the stack  
7 of flats after spin drying thereof to facilitate prompt  
8 exiting thereof from said housing.

1 19. An apparatus for drying a stack of flats as defined in  
2 Claim 1 wherein said drive means is operable to drive  
3 simultaneous rotation of said drive engagement means,  
4 the stack of flats, and said lifting head means  
5 responsive to said stack lifting means moving  
6 vertically within said housing means into contact the  
7 stack of flats for lifting thereof upwardly into  
8 abutting engagement with respect to said drive  
9 engagement means.

1 20. An apparatus for drying a stack of flats comprising:  
2 A. a housing means defining a base level therewithin  
3 and adapted to receive a stack of flats  
4 transported thereinto at said base level for  
5 facilitating drying thereof;  
6 B. a lifting head means being vertically movably

7 positioned within said housing means to allow  
8 movement upwardly into contact with a stack of  
9 flats positioned thereabove at said base level to  
10 facilitate lifting thereof to a position above  
11 said base level, said lifting head means being  
12 movable rotatably relative to said housing means  
13 about a lifting axis of rotation extending  
14 vertically therewithin, said lifting head means  
15 including a support plate means rotatably mounted  
16 within said housing and vertically movable  
17 therewithin, said support plate means including  
18 support pin means extending vertically therefrom  
19 and adapted to facilitate engagement of said  
20 support plate means with respect to the  
21 undersurface of the stack of flats to facilitate  
22 retaining thereof during upward movement thereof  
23 and during spin drying thereof;

24 C. a stack lifting means positioned within said  
25 housing means at a location below said base level,  
26 said stack lifting means including an extensible  
27 cylinder means for urging movement of said lifting  
28 head means upwardly into abutment with respect to  
29 a stack of flats at said base level and for  
30 lifting thereof upwardly to said spin level for  
31 facilitating drying thereof, said stack lifting  
32 means being positionable at a retracted level



33 located below said base level within said housing  
34 means, said stack lifting means being attached to  
35 said lifting head means and also being vertically  
36 movable upwardly within said housing means to  
37 facilitate said lifting head means in engagement  
38 of a stack of trays located at said base level  
39 from beneath for lifting thereof vertically  
40 upwardly to a spin level to facilitate spin drying  
41 thereof, said spin level being located vertically  
42 above said base level within said housing means;

43 D. a drive engagement means mounted within said  
44 housing means at a position above a stack of flats  
45 positioned therein at said base level, said drive  
46 engagement means being mounted within said housing  
47 means to be rotatably movable therewithin about a  
48 drive axis of rotation, said lifting axis of  
49 rotation being positioned above and aligned  
50 vertically with respect to said drive axis of  
51 rotation to facilitate spinning of the stack of  
52 flats for drying thereof, said drive engagement  
53 means adapted to engage a stack of flats from  
54 above responsive to movement of the stack of flats  
55 upwardly into abutting contact therewith in order  
56 to urge rotational movement of the stack of flats  
57 responsive to rotational movement of said drive  
58 engagement means, said drive engagement means

59 including a spinner plate means rotatable about  
60 said drive axis of rotation and adapted to engage  
61 a stack of flats moved upwardly into contact  
62 therewith, said spinner plate means including a  
63 registration means adapted to positively engage a  
64 stack of flats moved upwardly into contact  
65 therewith to provide simultaneous coordinated  
66 rotation of said stack of flats responsive to  
67 powered rotation of said drive engagement means;  
68 and

69 E. a drive means mounted within said housing means  
70 above the stack of flats positioned at said base  
71 level, said drive means being operatively attached  
72 to said drive plate means for urging rotational  
73 movement thereof responsive to operation of said  
74 drive means to spin dry a stack of flats held at  
75 said spin level between said drive engagement  
76 means in abutment therewith from above and said  
77 lifting head means in abutment with the stack of  
78 flats from below and being urged into contact  
79 therewith by said stack lifting means being  
80 positioned at said spin level within said housing  
81 means.

1 21. An apparatus for drying a stack of flats comprising:

2 A. a housing means defining a base level therewithin

3 and adapted to receive a stack of flats  
4 transported thereinto at said base level for  
5 facilitating drying thereof, said housing means  
6 including a slotted wall means extending  
7 therearound to facilitate retaining of fluids  
8 expelled from the stack of trays during spin  
9 drying thereof, said slotted wall means being made  
10 of a translucent material to facilitate  
11 observation of the operation of the apparatus for  
12 drying flats;

13 B. a lifting head means being vertically movably  
14 positioned within said housing means to allow  
15 movement upwardly into contact with a stack of  
16 flats positioned thereabove at said base level to  
17 facilitate lifting thereof to a position above  
18 said base level, said lifting head means being  
19 movable rotatably relative to said housing means  
20 about a lifting axis of rotation extending  
21 vertically therewithin, said lifting head means  
22 including a support plate means rotatably mounted  
23 within said housing and vertically movable  
24 therewithin, said support plate means including  
25 support pin means extending vertically therefrom  
26 and adapted to facilitate engagement of said  
27 support plate means with respect to the  
28 undersurface of the stack of flats to facilitate

29 retaining thereof during upward movement thereof  
30 and during spin drying thereof;

31 C. a stack lifting means positioned within said  
32 housing means at a location below said base level,  
33 said stack lifting means including an extensible  
34 pneumatic cylinder means for urging movement of  
35 said lifting head means upwardly into abutment  
36 with respect to a stack of flats at said base  
37 level and for lifting thereof upwardly to said  
38 spin level for facilitating drying thereof, said  
39 stack lifting means being positionable at a  
40 retracted level located below said base level  
41 within said housing means, said stack lifting  
42 means being attached to said lifting head means  
43 and also being vertically movable upwardly within  
44 said housing means to facilitate said lifting head  
45 means in engagement of a stack of trays located at  
46 said base level from beneath for lifting thereof  
47 vertically upwardly to a spin level to facilitate  
48 spin drying thereof, said spin level being located  
49 vertically above said base level within said  
50 housing means;

51 D. a drive engagement means mounted within said  
52 housing means at a position above a stack of flats  
53 positioned therein at said base level, said drive  
54 engagement means being mounted within said housing

means to be rotatably movable therewithin about a drive axis of rotation, said lifting axis of rotation being positioned above and aligned vertically with respect to said drive axis of rotation to facilitate spinning of the stack of flats for drying thereof, said drive axis of rotation and said lifting axis of rotation being oriented axially coincident with respect to one another, said drive engagement means adapted to engage a stack of flats from above responsive to movement of the stack of flats upwardly into abutting contact therewith in order to urge rotational movement of the stack of flats responsive to rotational movement of said drive engagement means, said drive engagement means including a spinner plate means rotatable about said drive axis of rotation and adapted to engage a stack of flats moved upwardly into contact therewith, said spinner plate means including a registration means adapted to positively engage a stack of flats moved upwardly into contact therewith to provide simultaneous coordinated rotation of said stack of flats responsive to powered rotation of said drive engagement means, said registration means including a plurality of alignment pins mounted in said spinner plate means

81 and extending downwardly therefrom to facilitate  
82 registration of the stack of flats with respect to  
83 said spinner plate means for providing  
84 simultaneous rotational movement of the stack of  
85 flats responsive to powered rotation of said  
86 spinner plate means, said alignment pins being  
87 positioned in a pin array adapted to register with  
88 the stack of flats and cause same to rotate  
89 whenever said spinner plate means is caused to  
90 rotate, said pin array forming a rectangular  
91 profile to facilitate engaging of stacks of  
92 rectangularly shaped flats;

93 E. a drive means mounted within said housing means  
94 above the stack of flats positioned at said base  
95 level, said drive means being operatively attached  
96 to said drive plate means for urging rotational  
97 movement thereof responsive to operation of said  
98 drive means to spin dry a stack of flats held at  
99 said spin level between said drive engagement  
100 means in abutment therewith from above and said  
101 lifting head means in abutment with the stack of  
102 flats from below and being urged into contact  
103 therewith by said stack lifting means being  
104 positioned at said spin level within said housing  
105 means, said drive means including:

106 (1) a spinner motor for rotationally driving said

107 drive engagement means selectively; and  
108 (2) a motor braking means to facilitate slowing  
109 of the rotational movement of the stack of  
110 flats after spin drying thereof facilitate  
111 prompt exiting thereof from said housing and  
112 further to facilitate alignment of the stack  
113 of flats with respect to the transporting  
114 means after spin drying; and  
115 F. a stack conveying means for transporting stacks of  
116 trays into and out from said drying station means.